

THE GREENHOUSE EFFECT IN ENVIRONMENT

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ABSTRACT

The Earth is warm because, the greenhouse effect keeps some of the planet's heat that would otherwise escape from the atmosphere out to space. In fact, without the greenhouse effect, the Earth's average global temperature would be much colder and we can't imagine life on Earth. The interaction between the Sun's energy and greenhouse gases, such as Carbon dioxide, Methane, Nitrous oxide and the fluorinated gases is the actual reason of the greenhouse effect. The natural process of greenhouse effect plays a critical role in regulating the Earth's overall temperature.

KEYWORDS: Average Global Temperature, Sun's Energy & Carbon Dioxide

INTRODUCTION

A green house effect is meant for plants, mainly in the cold countries, where total isolation at least during winter season is not sufficient enough, to support plant growth. The gasses of green house are such that, these allow the visible sunlight to enter, but prevent the long wave infrared rays to go out. A green house also does not have any provision for artificial heating. The greenhouse effect is, warming near the Earth's surface that results when the Earth's atmosphere traps the sun's heat, as the resultant atmosphere acts much like the glass walls and roof of a greenhouse.

In 1824 the greenhouse effect was discovered by Joseph Fourier.

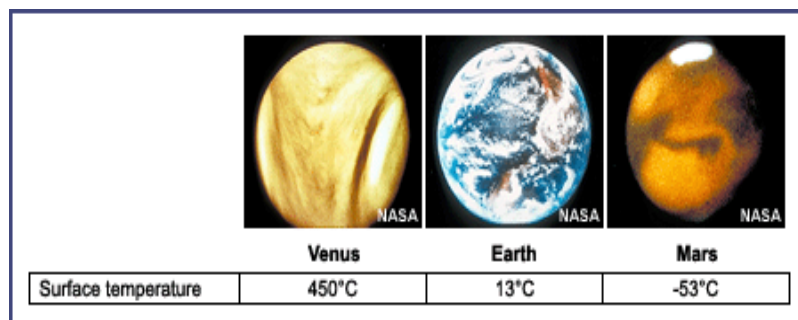


Figure 1

According to the principle of Goldilocks-Mars is too cold planet and Venus is a very hot planet but Earth is just right. The earth has an average surface temperature between the water's boiling and freezing point, that's why the Earth is suitable for our sort of life and having the right kind of atmosphere, due to availability of moderate temperatures. Venus has a Venusian blanket (too thick) and would produce hellish atmosphere, while Mars has a Martian blanket (too thin) and would produce shivering atmosphere, but the Earth has a collection of atmospheric gases (greenhouse gases) and trap heat like the glass walls and produce a pleasant range of temperature.

CO₂ is confined exclusively to the troposphere, its higher concentration may act as a serious pollutant. Under normal conditions, with normal CO₂ concentration the temperature at the surface of the Earth is maintained by the energy

balance of the sun rays, that strike the planet and heat that is radiated back into space. When there is an increase in CO₂ concentration, the thick layer of this gas prevents the heat from being re-radiated out. Thus, this thick CO₂ layer function like the glass panels of a greenhouse, or the glass windows of a motor car, allowing the sunlight to filter through, but preventing the heat from being re-radiated into outer space. This is called **Greenhouse effect**.

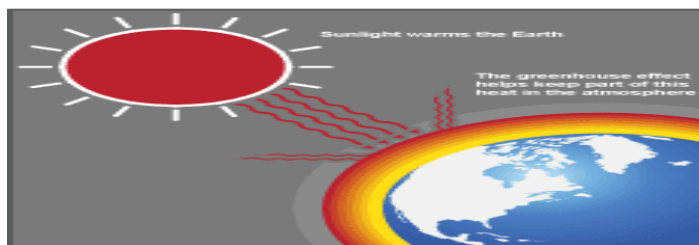


Figure 2

An increase in CO₂ level in the atmosphere, increases the photosynthesis rate to some extent. Acting as fertilizer, especially in effect may be exploited by using modified crop varieties and agricultural practices. However, an increase in CO₂ concentration in the atmosphere may result into disastrous greenhouse effect.

The phenomenon of increasing the temperature of the earth's surface, due to the thermal radiations trapped from a planetary surface is absorbed by greenhouse gases, and is re-radiated in all directions, since part of this re-radiation is back towards the surface, energy is transferred to the surface and the lower atmosphere, as a result the temperature is higher than it would be direct heating, by solar radiation were the only warming mechanism. The greenhouse effect is keeping the Earth warm because, it keeps some of the planet's heat that would otherwise escape from the atmosphere, out to space. In fact, without the greenhouse effect, the Earth's average global temperature would be much colder and life on Earth would not be possible.

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Greenhouse Gases

The most significant greenhouse gas is CO₂ (carbon dioxide), which is released to the atmosphere by burning of fossil fuels, for different purposes in various ways. Other greenhouse gases are H₂O (water vapor), N₂O (Nitrous oxide) and CH₄ (Methane), these gases are global insulators.

While, most heat is absorbed by CO₂ layer and water vapors in the atmosphere, which adds to the heat that is already present, the net result is the heating up of the earth's atmosphere. Thus, increasing CO₂ levels tend to warm the air on a global scale, in the lower layers of atmosphere.

The main reason behind global warming, is the increase in the concentration of greenhouse gases in the atmosphere, due to the greenhouse effect. The greenhouse gases plays the major role in the greenhouse effect and excessive emission of these gases, through various means is a major cause of global warming.

Minor green house gases like halogenated gases (chlorofluorocarbons) and halons, are released to the atmosphere during the operation and maintenance of appliances and equipments, using chlorofluorocarbons as coolants and propel-

lants, examples: Air conditioners, refrigeration, several cosmetic goods, plastic foams, and fire extinguishers.

An Everyday Example of Green House Effect

If a car that has been left parked in the sun for a couple of hours, when you open the door of a car you'll find that, the car's temperature inside is much warmer than the outside temperature. Reason is that, the windows of the car allow the sunlight to enter and if light once enters inside, is then partially converted into heat. So that, the car windows do not allow the heat present inside the car to pass through, as easily as light and some of this heat accumulates. The result is that, more heat remains inside and the temperature is high inside the car, when compared to the outside temperature.

Impact of Greenhouse Effect

- Some analysts believe that by 2050, the Earth's mean temperature would increase by 1.5 to 4.5°C.
- The polar ice caps would melt.
- A rise of five degrees would raise the sea level by five meters within a few decades, threatening all the densely populated coastal cities from Shanghai to San Francisco.
- North America would be warmer and drier.
- India's annual monsoon rains may even cease altogether.
- A rise in sea level of 50-100 cm, caused by ocean warming would flood low-lying lands in Bangladesh and West Bengal.
- Due to the greenhouse effect, there may occur more hurricanes and cyclones, and early snow melts in mountains causing more floods during monsoon.

Remedial Measures for Greenhouse Effect

The foremost step to arrest the problem of ever-increasing greenhouse effect and expected rise in the global mean temperature, is to prevent or to reduce the release of additional CO₂ from the combustion of fossil fuels and through deforestation. There are some measures to decrease the increasing Greenhouse effect.

- There should be drastic cut in the consumption of fossil fuels, mainly in the developed and highly industrialized countries
- Advanced and efficient technologies should be developed so that, maximum energy may be derived from the use of existing fossil fuels, and emissions of carbon dioxide may be minimized and improved better technologies.
- Scientists must discover and develop alternative sources of power and energy.
- Solar energy may be developed as an alternative to the conventional fossil fuel energy, at least in those countries where sunlight is available, during most of the period of the year.
- As the forests are natural 'sink' of Carbon dioxide, so there should be reforestation on a large scale, which will reduce the greenhouse effect.

CONCLUSIONS

The earth is going to be warmer day by day, due to the enhancement of the greenhouse effect, which is creating climate changes, affecting weather of the planet and creating global warming. The main reason behind global warming is the increase in the concentration of greenhouse gases in the atmosphere, due to the greenhouse effect. The greenhouse gases play the major role in the greenhouse effect, and excessive emission of these gases through various means is a major cause of global warming. The foremost step to arrest the problem of ever-increasing greenhouse effect and expected rise in the global mean temperature, is to prevent or to reduce the release of additional CO₂ from the combustion of fossil fuels and through deforestation.

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